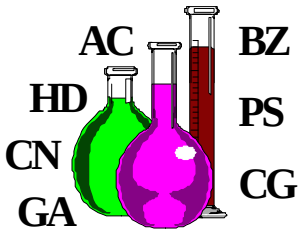
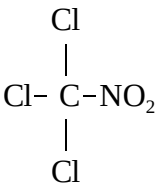
U.S. Army Center for Health Promotion and Preventive Medicine



Detailed Facts About Tear Agent Chloropicrin (PS)

218-22-1096

Physical Properties of Chloropicrin

Chemical Structure	
Chemical Formula	$CCl_3 NO_2$
Description	PS is a colorless, oily liquid with a stinging pungent odor.
Molecular Weight	164.3
Boiling Point	112°C
Vapor Pressure (mm Hg)	20 @ 20°C
Freezing Point	-69°C
Density	Liquid = 1.66 g/cc Vapor = 5.6 (air = 1)
Solubility	Insoluble in water; soluble in organic solvents, lipids, organophosphorus compounds, mustards, phosgene, diphosgene, and Cl_2.
Flash Point	Not combustible, but with strong initiation, heated material under confinement will detonate.

Agent PS - The chemical chloropicrin, Chemical Abstract Service Registry No. 0076-06-2.

Volatility	55,700 mg/m^3 @ 0°C 99,000 mg/m^3 @ 10°C 164,500 mg/m^3 @ 20°C 210,700 mg/m^3 @ 25°C 267,500 mg/m^3 @ 30°C
Toxicity Values	LCt_{50} = 2,000 mg-min/m^3

Exposure Limits

Workplace Time-Weighted Average -	0.7 mg/m^3
General Population Limits -	No standard available

Toxic Properties of Chloropicrin

PS was used in large quantities during World War I; it was stockpiled during World War II and is no longer authorized for military use. PS is more toxic than chlorine but less toxic than phosgene (CG).

Overexposure Effects

Chloropicrin is a powerful irritant whose vapors cause lung, skin, eye, nose and throat irritation, coughing and vomiting. As an eye irritant, it produces immediate burning, pain and tearing. In high concentration, PS damages the lungs, causing pulmonary edema. Exposure to liquid PS can cause severe burns on the skin that generally result in blisters and lesions. The lowest irritant concentration is 9 mg-min/m^3 for 10 minutes, and the median lethal concentration is 2,000 mg-min/m^3.

Emergency and First Aid Procedures

Inhalation: remove the victim to fresh air immediately; perform artificial respiration if breathing has stopped; keep the victim warm and at rest; seek medical attention immediately.

Eye Contact: wash eyes immediately with copious amounts of water, lifting the lower and upper lids occasionally; do not wear contact lenses when working with this chemical; seek medical attention immediately.

Skin Contact: wash the contaminated skin using soap or mild detergent and water; remove the contaminated clothing immediately; wash the skin using soap or mild detergent and water; if irritation persists after washing, seek medical attention immediately.

Ingestion: give victim copious amounts of water immediately; induce vomiting by having victim touch the back of his throat with his finger; do not make an unconscious person vomit; seek medical attention immediately.

Protective Equipment

Protective Gloves:	Wear impervious gloves.
Eye Protection:	Wear face shields (eight-inch minimum) or dust- and splash-proof safety goggles to prevent any possibility of skin contact with liquid chloropicrin.
Other:	Wear a complete set of protective clothing to include gloves and lab coat, apron, boots, plastic coveralls; other protective clothing and equipment should be available to prevent contact with the skin or clothing; remove contaminated clothing immediately, do not wear clothing until it has been properly laundered.

Reactivity Data

Stability:	Instability occurs with high temperatures or severe shock, particularly when involving containers of greater than 30 gallons capacity; unstable liquid.
Incompatibilities:	Contact with strong oxidizers may cause fires or explosions.
Hazardous Decomposition:	Toxic gases and vapors (such as oxides of nitrogen, phosgene, nitrosyl chloride, chlorine, and carbon monoxide) may be released when chloropicrin decomposes.
Corrosive Properties:	Liquid chloropicrin will attack some forms of plastics, rubber, and coatings.
Persistency	Short.

References

1. Department of the Army Field Manual (DA FM) 3-9, *Potential Military Chemical/Biological Agents and Compounds*, 1990.

2. Genium's Reference Collection, *Material Safety Data Sheets No. 702, Chloropicrin*, Genium Publishing Corporation, Schenectady, New York, 1990.

3. U.S. Army Chemical Command Materiel Destruction Agency, *Site Monitoring Concept Study,* 15 September 1993.

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